

# Horizons

## Pre-Algebra

Student Book



$$p(n,r) = \frac{n!}{(n-r)!}$$

$$4^3 = 64$$



$$6x + 15 > 5x - 16$$



$$\begin{array}{r} 4x^2 + 3x - 5 \\ x + 3 \\ \hline \end{array}$$

$$3x = 1$$

- 4 Find the greatest common factor of each set of numbers.

18, 24, and 36

14, 35, and 42

20, 32, and 36

- 5 Simplify.

$43.2 \times 10^0 =$

$0.063 \times 10^0 =$

$2.7 \div 10^0 =$

$0.871 \times 10^{-1} =$

$27.96 \times 10^1 =$

$66.49 \div 10^1 =$

$6.492 \times 10^{-2} =$

$3.18 \div 10^2 =$

$31.45 \div 10^2 =$

$0.5 \times 10^{-3} =$

$549.618 \div 10^3 =$

$0.088 \div 10^3 =$

- 6 Solve the word problems. Remember to label your answers.

*Recipe for Buttermilk Biscuits (Makes 4 dozen biscuits)*

*8 cups flour*

*8 tablespoons butter*

*5 teaspoons baking powder*

*8 tablespoons shortening*

*1 teaspoon baking soda*

*4 cups buttermilk, chilled*

*1 tablespoon salt*

Diann is cooking for 192 people at church on Wednesday night. How much of each ingredient does Diann need to serve one biscuit to each person?



A 5-pound bag of flour contains about 20 cups of flour. How many 5-pound bags of flour must Diann purchase to ensure she has enough flour to bake biscuits for 192 people?

1. The aerial bucket ride at an amusement park allows a maximum of 8 park guests to exit or board at each stop. The chart below shows how many guests boarded and exited the bucket ride in each of the first 5 stops. If there were 38 guests on the ride at the start, how many were on the ride after the 5th stop?

Stop	A	B	C	D	E
Boarded	6	4	7	8	8
Exited	2	8	5	4	3

- A. 10  
B. 16  
C. 34  
D. 38  
E. 49
2. Given  $x + 3 = 7$  and  $y + 12 = 20$ , what is the value of  $x + y$ ?
- A. 4  
B. 8  
C. 12  
D. 32  
E. 42
3. In a football game, a touchdown with an extra point is worth a total of 7 points. A field goal is worth 3 points. If a team has 23 points, how many field goals have they scored? (Assume all extra points were made and no safeties or 2-point conversions were scored.)
- A. 1  
B. 2  
C. 3  
D. 4  
E. 5
4. Given  $x$  is the square of an integer and a multiple of 9 and 18, find the value of  $x$ .
- A. 3  
B. 6  
C. 9  
D. 18  
E. 36



A **rectangle** is a parallelogram with four congruent angles. Because a rectangle is a parallelogram, the formulas for perimeter and area remain the same.

A **square** is a rectangle with four congruent sides. Because a square has four congruent angles and four congruent sides, the formulas for perimeter and area can be simplified as follows:

$$P = 4s, \text{ where } s \text{ is the length of a side}$$

$$A = s^2, \text{ where } s \text{ is the length of a side}$$

List everything you know to be true about the diagram below. Find the perimeter and area.



Given:  $\square DCBA$ ;  $DC = 7$ ;  $CB = 4$

What you know:

It is a parallelogram. It is rectangle.

$$\overline{AB} \parallel \overline{DC}, \overline{AD} \parallel \overline{BC}, \overline{AB} \cong \overline{DC}, \overline{AD} \cong \overline{BC}$$

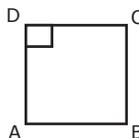
Each of the angles is equal to  $360^\circ \div 4 = 90^\circ$ .

Perimeter is  $2(7) + 2(4) = 14 + 8 = 22$  units.

The area is  $7(4) = 28$  square units.

### 1 CLASSWORK

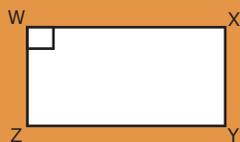
List everything you know to be true about the diagram below. Include the perimeter and area.



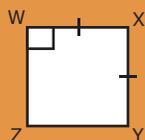
Given:  $\square DCBA$ ;  $DC = 5$ ;  $CB = 5$

### ACTIVITIES

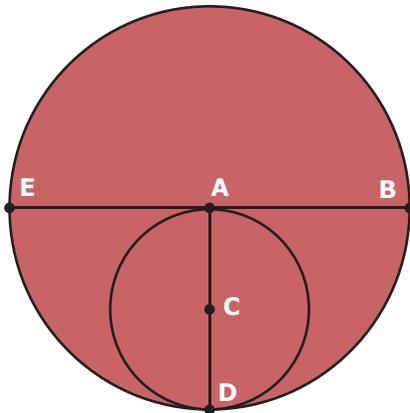
2 List everything you know to be true about the diagrams below. Include the perimeter and area.



Given:  $\square WXYZ$ ;  $WX = 4\frac{1}{2}$ ;  $XY = 2\frac{1}{4}$

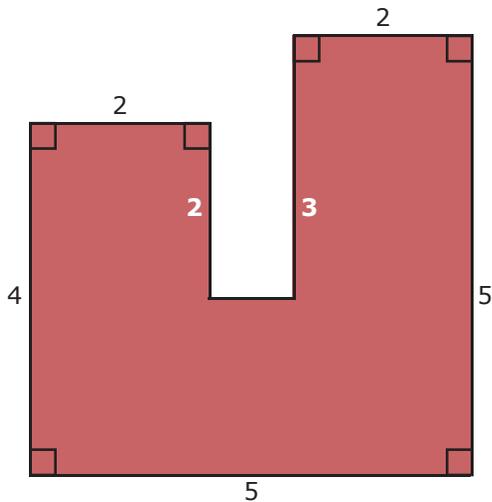


Given:  $\square WXYZ$ ;  $WX = 4\frac{1}{2}$



- In the figure above,  $A$  is the center of the large circle and  $C$  is the center of the small circle. If  $CD = 3$ , what is the length of  $\overline{EB}$ ?

  - A. 6
  - B. 9
  - C. 12
  - D. 15
  - E. 18



- What is the area of the figure above?

  - A. 20
  - B. 22
  - C. 23
  - D. 24
  - E. 25



## A Math Minute with...

### Amie D. – Missionary Nurse

**What is your occupation?** I am a registered nurse and missionary wife.

**Where do you work?** I work in Soroti, Uganda. I am the mother of three. I am also the nurse for 30 orphans at the Soroti Orphan Assistance project (S.O.A.P) orphanage.

**Did you attend college? If so, what was your major?** Yes, I have a B.S. degree in nursing.

**What parts of your job require the use of math?** The recipes that I use have the oven temperatures in degrees Fahrenheit while the ovens I use are in Celsius. I need to convert the oven temperatures from Fahrenheit to Celsius. I also use math to calculate the medication dosages for children.

**What is the biggest “problem” you have faced that required the use of math to solve?** When a child needs medicine, I need to convert the dosages of the medication for that specific child.

**Are there any other interesting math uses you have experienced?** I use math to determine how much flour, sugar, etc. I need to buy to make various recipes. I also need to keep within a grocery shopping budget. This is difficult because I don't know the value of the dollar until I arrive in the capital city. When I get there, I buy groceries for the next two months. I need to determine how many kilos of ground beef I will need for two months of dinners.



A **function** is an equation in which each value of the independent variable has exactly one corresponding value of the dependent variable.

The values assigned to the independent variable are called the **domain**.

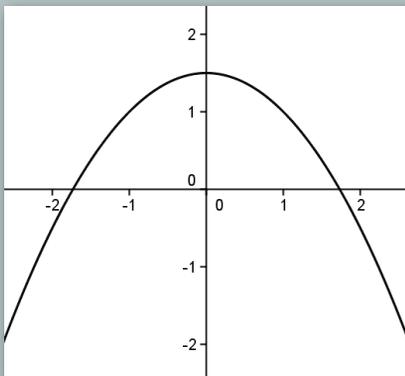
The corresponding values of the dependent variable are called the **range**.

A function is written in the format  $f(x)$  and is read, "the function  $f$  of  $x$ ," or, "the  $f$  of  $x$ ."

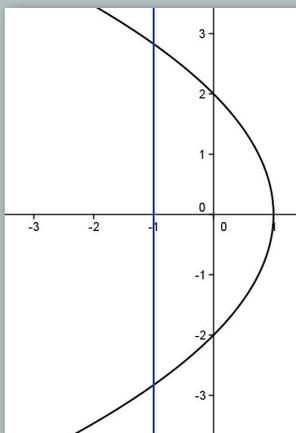
When graphing a function, the  $f(x)$  side of the equation corresponds to the  $y$  portion of an equation. Plot points as usual and graph.

To look at a graph and instantly determine whether or not the graph is a function, use the **vertical line test**. If you can draw a vertical line on the graph and cross the graph in two or more points, the graph is not a function. Otherwise, the graph is a function.

Tell whether or not each graph is a function.



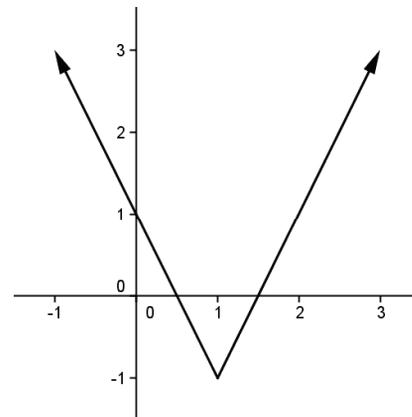
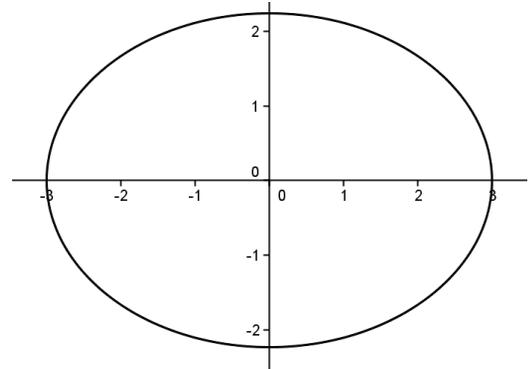
Yes. There is no way to draw a vertical line that intersects the graph in more than one point.



No. Notice that the blue vertical line intersects the graph in two places.

**1 CLASSWORK**

Tell whether or not each graph is a function.



Graph the function  $f(x) = 2x - 1$ .

ACTIVITIES

1 Find the area of each base, and the volume of a prism having the indicated height.

Base of Prism	Area of Base	Prism Height	Volume of Prism
		$3\frac{3}{5}$ in.	
		2.1 cm	
		$4\sqrt{3}$ ft.	
		7.03 m	
		$5\sqrt{2}$ yd.	

2 Complete the chart for cones.

Radius	Height	Slant Height	Volume	Lateral Area	Surface Area
5.2 in.	1.8 in.	1.8 in.			
6 m	8 m	10 m			